

U.S. Patent Application Serial No. **09/361,610**
Amendment filed November 2, 2004
Reply to OA dated August 10, 2004

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-21 (canceled).

1 Claim 22 (previously presented): A digital camera, comprising:

2 an imager including a vertical transfer register having a plurality of transfer areas, a
3 horizontal transfer register connected to an output terminal of said vertical transfer register, and a
4 plurality of light-receiving elements respectively assigned to said plurality of transfer areas;

5 a timing generator connected to said imager, and for applying timing signals to said imager,

6 wherein said timing signals include a first exposure signal for carrying out a first exposure of a first
7 time period, a second exposure signal for carrying out after said first exposure a second exposure of
8 a second time period, which is shorter than said first time period, a first reading signal for reading-
9 out from first light-receiving elements intermittently present in a vertical direction out of said
10 plurality of light-receiving elements to said vertical transfer register first electric charges generated
11 by said first exposure, a second reading signal for reading-out from second light-receiving elements
12 respectively assigned to vacant transfer areas in which no electric charge is present out of said

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13 plurality of light-receiving elements to said vertical transfer register second electric
14 charges generated by said second exposure, a vertical transfer signal for transferring the electric
15 charges read-out to said vertical transfer register in a vertical direction, and a horizontal transfer
16 signal for transferring in a horizontal direction the electric charges that reaches said horizontal
17 transfer register by a transfer in accordance with said vertical transfer signal, and wherein said
18 second light receiving elements are intermittently present in the vertical direction, and said first
19 electric charges read out by said first reading signal and said second electric charges read out by said
20 second reading signal are alternately arranged on said vertical transfer register; and
21 a processor for generating one screen of a first image signal based on said first electric
22 charges and said second electric charges output from said imager;
23 an instruction key for inputting an imaging instruction; and
24 a shutter member arranged at a front surface of said imager, and for cutting-off an irradiation
25 of light into said imager; wherein
26 said timing signal further includes a third exposure signal output in response to an operation
27 of said instruction key, and for carrying out a third exposure of a third time period, a third reading
28 signal for reading out from said plurality of light-receiving elements to said vertical transfer register
29 third electric charges generated by said third exposure, a second vertical transfer signal for
30 transferring in a vertical direction said third electric charges on said vertical transfer register, a
31 second horizontal transfer signal for transferring in a horizontal direction said third electric charges
32 applied to said horizontal transfer register, a fourth exposure signal for carrying out a fourth exposure

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33 after said third exposure, a driving signal output after a fourth time period, which is different from
34 said third time period, has passed since a time of starting said fourth exposure, and for driving said
35 shutter member, a fourth reading signal for reading out fourth electric charges generated by said
36 fourth exposure from said plurality of light-receiving elements to said vertical transfer register after
37 a completion of a vertical transfer of said third electric charges, a third vertical transfer signal for
38 transferring in a vertical direction said fourth electric charges on said vertical transfer register, and
39 a third horizontal transfer signal for transferring in a horizontal direction said fourth electric charges
40 applied to said horizontal transfer register, and said processor generating one screen of a second
41 image signal based on said third electric charges and fourth electric charges output from said imager.

1 Claim 23 (previously presented): A digital camera according to claim 22, further comprising
2 a recorder for recording said second image signal into a recording medium in a compressed state.

Claims 24-27 (canceled).

1 Claim 28 (previously presented): A digital camera, comprising:
2 an imager including a vertical transfer register having a plurality of transfer areas, a
3 horizontal transfer register connected to an output terminal of said vertical transfer register, and a
4 plurality of light-receiving elements respectively assigned to said plurality of transfer areas;
5 an exposure controller for controlling an exposure of said imager by using an electric shutter

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6 system;

7 a reader for reading out from a portion of said plurality of light-receiving elements to said

8 vertical transfer register electric charges generated by an exposure of said exposure controller;

9 a vertical transferor for transferring in a vertical direction the electric charges read-out to said

10 vertical transfer register by said reader;

11 a horizontal transferor for transferring in a horizontal direction the electric charges that reach

12 said horizontal transfer register by a transfer of said vertical transferor, wherein said exposure

13 controller carries out a first exposure of a first time period, and carries out after said first exposure

14 a second exposure of a second time period, which is shorter than said first time period, said reader

15 reads out from first light-receiving elements intermittently present in a vertical direction out of said

16 plurality of light-receiving elements to said vertical transfer register first electric charges generated

17 by said first exposure, and reads out from second light-receiving elements respectively assigned to

18 vacant transfer areas in which no electric charge is present out of said plurality of light-receiving

19 elements to said vertical transfer register second electric charges generated by said second exposure,

20 and wherein said second light-receiving elements are intermittently present in the vertical direction,

21 and said first electric charges and said second electric charges read out by said reader are alternately

22 arranged on said vertical transfer register; and

23 a generator for generating one screen of a first image signal based on said first electric

24 charges and said second electric charges output from said imager;

25 an instruction key for inputting an imaging instruction;

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26 a shutter member arranged at a front surface of said imager, and for cutting-off an irradiation
27 of light into said imager; and

28 a driver for driving said shutter member, wherein said exposure controller carries out a third
29 exposure of a third time period in response to an operation of said instruction key, and starts a fourth
30 exposure after said third exposure, said reader reads out from said plurality of light-receiving
31 elements to said vertical transfer register third electric charges generated by said third exposure, and
32 reads out fourth electric charges generated by said fourth exposure from said plurality of light-
33 receiving elements to said vertical transfer register after a completion of a vertical transfer of said
34 third electric charges, said driver drives said shutter member when a fourth time period, which is
35 different from said third period, has passed since a time of starting said fourth exposure, and said
36 generator generates one screen of a second image signal based on said third electric charges and said
37 fourth electric charges output from said imager.

1 Claim 29 (previously presented): A digital camera according to claim 28, further comprising
2 a recorder for recording said second image signal into a recording medium in a compressed state.

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